

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

New claims 14-20 have been added.

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

After amending the claims as set forth above, claims 1-20 are now pending in this application.

Rejection under 35 U.S.C. § 112

The Advisory Actions dated February 21, 2007 and March 9, 2007 indicated that the after-final amendment to claim 12 had been entered and that the rejection of claim 12 under 35 U.S.C. § 112 had been withdrawn. Applicant gratefully acknowledges the withdrawal of this rejection.

Rejection under 35 U.S.C. § 102

Claims 1, 2, 7-11, and 13 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,791,558 (hereafter “Hoshino et al.”). This rejection is respectfully traversed, especially in light of the clarifying amendments made above.

Amended claim 1 recites a heating device for a motor vehicle that includes an internal combustion engine and an engine coolant circuit, the heating device comprising: a housing defining a heat generation chamber, a rotor mounted in the heat generation chamber for rotation on a drive shaft, a cooling jacket defining a cooling chamber in heat exchange relationship with the heat generation chamber, the cooling chamber being adapted for circulating the engine coolant and including a coolant inlet and a coolant outlet, wherein the cooling chamber has a portion that extends in a radial direction of the heating device to

substantially the same extent as the heat generation chamber and is axially adjacent to the heat generation chamber, and a pump wheel driven by the drive shaft, wherein the pump wheel is arranged in said portion of the cooling chamber, and wherein the pump wheel is configured to circulate coolant within the cooling chamber. Claims 2, 7-11, and 13 depend from claim 1.

Hoshino et al. discloses a vehicle heating system that includes a heat-generating chamber 14 adjacent to a water jacket WJ₂. See Hoshino et al. at col. 6, lines 44-48. A rotor 15 is disposed within the heat-generating chamber 14 and is press-fitted to a shaft 11. See Hoshino et al. at col. 6, lines 44-52. An impeller for circulating water is fixed to a trailing end of the shaft 11. See Hoshino et al. at col. 6, lines 35-36; col. 7, lines 42-50. Hoshino et al. discloses that shearing caused by the rotor 15 heats silicone oil within the heat-generating chamber 14. See Hoshino et al. at col. 7, lines 46-50.

However, Hoshino et al. does not disclose that the impeller 12 is arranged in a cooling chamber that extends in a radial direction of the heating device to substantially the same extent as the heat-generating chamber 14, wherein the cooling chamber is axially adjacent to the heat-generating chamber 14, wherein the impeller 12 is arranged in the cooling chamber, and the impeller 12 is configured to circulate coolant in the cooling chamber. Hoshino et al. discloses that heat generated in the heat-generating chamber 14 is heat-exchanged to water circulated in water jacket WJ₂. See Hoshino et al. at col. 7, lines 51-53. As shown in Figure 1 of Hoshino et al., the impeller 12 is located at an axial distance from the water jacket WJ₂. Instead, the impeller 12 is located in a water pump WP within water jacket WJ₁. The water channel extending between water jacket WJ₂ and the impeller 12, as shown in Figure 1 of Hoshino et al., does not extend in a radial direction to substantially the same extent as the heat-generating chamber 14. Furthermore, the area where the impeller 12 and water pump WP are located is not axially adjacent to the heat-generating chamber 14.

The impeller 12 disclosed by Hoshino et al. is not a pump wheel driven by the drive shaft, wherein the pump wheel is arranged in said portion of the cooling chamber and is configured to circulate coolant within the cooling chamber, wherein the cooling chamber has

a portion that extends in a radial direction of the heating device to substantially the same extent as the heat generation chamber, axially adjacent to the heat generation chamber.

Therefore, Hoshino et al. fails to identically disclose or describe all of the features recited in claim 1. Withdrawal of this rejection is respectfully requested.

Claim 2

Claim 2 depends from claim 1 and is allowable over Hoshino et al. for at least the reasons discussed above. Claim 2 further recites “wherein the cooling jacket has a central protuberance which is arranged coaxially to the drive shaft, wherein the pump wheel is arranged on one side of the central protuberance along an axial direction of the heating device and an axial end of the drive shaft is arranged on another side of the central protuberance.”

Hoshino et al. discloses that the impeller is fixed to a trailing end of the shaft 11. See Hoshino et al. at col. 6, lines 35-36; col. 7, lines 42-50. As shown in Figure 1 of Hoshino et al., the end of the shaft 11 extends into the chamber where the impeller 12 is located. Hoshino et al. does not disclose a heating device, “wherein the cooling jacket has a central protuberance which is arranged coaxially to the drive shaft, wherein the pump wheel is arranged on one side of the central protuberance along an axial direction of the heating device and an axial end of the drive shaft is arranged on another side of the central protuberance” because the impeller 12 and axial end of the shaft 11 are not arranged on opposite sides of a central protuberance that is part of a cooling jacket. Therefore, Hoshino et al. does not disclose all of the features recited in claim 2. Withdrawal of this rejection is respectfully requested.

Rejection under 35 U.S.C. § 103

Claims 3-5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hoshino et al. in view of U.S. Patent No. 4,308,994 (hereafter “Perhats”). This rejection is respectfully traversed. Perhats discloses a vehicle circulation system that includes a radiator 1 with a hot water circuit 2 and a cold water return circuit 3; hot water transmitting conduits 6, 8; and a circulation device 7 interposed between hot water transmitting conduit 6 and hot water

transmitting conduit 8. See Perhats at col. 6, lines 1-4, 17-21. Perhats discloses that the circulation device 7 is an integrated pump motor device that includes an impeller blade 16 that revolves due to the magnetic interaction of yoke 20 and the magnetic base 23 of the impeller blade 16. See Perhats at col. 6, lines 63-68. However, the impeller blade 16 is not arranged in a coolant chamber because the circulation device 7 is arranged within the hot water transmitting circuit of the circulation system. Therefore, Perhats does not cure the deficiencies of Hoshino et al. Withdrawal of this rejection is respectfully requested.

Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Hoshino et al. in view of Perhats and further in view of U.S. Patent No. 6,388,346 (hereafter “Lopatinsky et al.”). This rejection is respectfully traversed. Lopatinsky et al. fails to remedy the deficiencies of Hoshino et al. discussed above in regard to independent claim 1, from which claim 6 depends. Withdrawal of this rejection is respectfully requested.

New Claims

New claims 14-20 have been added. Claims 19 and 20 depend from claim 1 and are allowable over the prior art for at least the reasons discussed above.

Claim 14 recites a heating device for a motor vehicle, comprising: a housing defining a heat generation chamber, a drive shaft, a rotor mounted in the heat generation chamber, wherein the rotor is driven by the drive shaft, a cooling jacket defining a cooling chamber, wherein the housing and the cooling jacket are configured so that the heat generation chamber and the cooling chamber are immediately adjacent to one another in an axial direction of the heating device, and a pump wheel driven by the drive shaft, wherein the pump wheel is arranged in the cooling chamber, axially adjacent to the heat generation chamber, and wherein the pump wheel is configured to circulate coolant in the cooling chamber. Claims 15-18 depend from claim 14.

The prior art, including Hoshino et al., does not disclose or suggest a heating device, “wherein the housing and the cooling jacket are configured so that the heat generation chamber and the cooling chamber are immediately adjacent to one another in an axial direction of the heating device...wherein the pump wheel is arranged in the cooling chamber,

axially adjacent to the heat generation chamber.” As shown in Figure 1 of Hoshino et al., the chamber that the impeller 12 is arranged in is at an axial distance from the heat-generating chamber 14 so that this chamber is not immediately adjacent to the heat-generating chamber 14. Nor is the impeller 12 axially adjacent to the heat-generating chamber 14 of Hoshino et al.

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.


The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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Date _____

By 

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